



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

K Area Overview/Update

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DOE-Savannah River

Citizens Advisory Board

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- To provide information on K-Area and Plutonium storage which fulfills a Nuclear Materials Program work plan item.



Acronyms

CCO – Criticality Container Over-pack

DOE – Department of Energy

DE – Destructive examination

FGE – Fissile Gram Equivalent

KIS – K Interim Surveillance

LANL – Los Alamos National Laboratory

LLNL – Lawrence Livermore National Laboratory

MIS – Materials Identification and Surveillance

NDA – Non-destructive assay

NDE – Non-destructive examination

PSI – Pounds per square inch
(gas pressure above atmospheric)

Pu – Plutonium

RFETS – Rocky Flats Environmental Technology Site

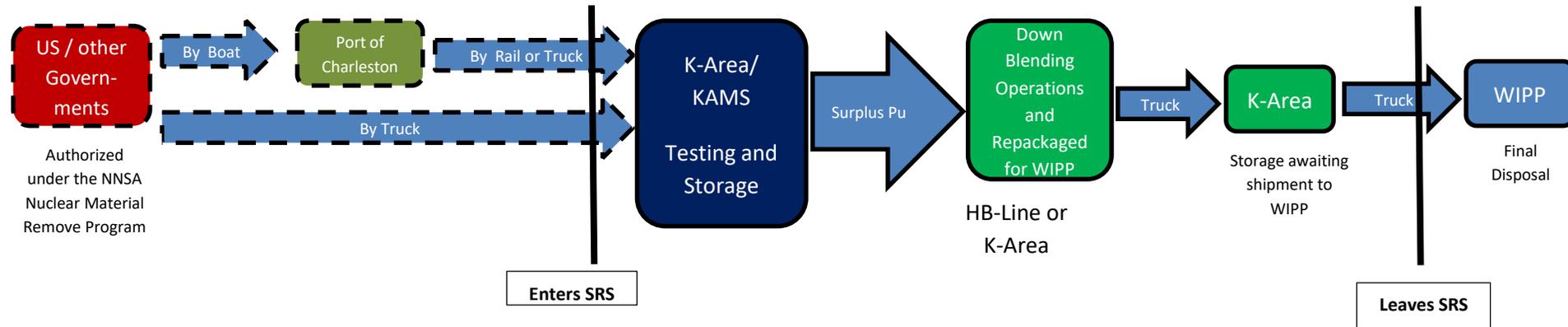
SRS – Savannah River Site

SRNL – Savannah River National Laboratory

SWMF – Solid Waste Management Facility

WIPP – Waste Isolation Pilot Plant

SRS EM Plutonium Flow Path



Key:

AFS-2 – Alternate Feed Stock #2	Pu – Plutonium
EM – Environmental Management	SRS – Savannah River Site
KAMS – K-Area Material Storage	WIPP – Waste Isolation Pilot Plant
MOX - Mixed Oxide	————— EM Activity
NNSA – National Nuclear Security Administration	- - - - - NNSA Activity

- 1994 Department decided to stabilize, package and store excess plutonium until final disposition
- 1994 Department issued Standard DOE-STD-3013, “Stabilization, Packaging, and Storage of Plutonium-Bearing Materials”
 - Robust oxide stabilization – at least 950 °C for two hours
 - Robust packaging – two welded, nested stainless steel containers
 - Requires surveillance program to assure there is no long term degradation of containers
- Plutonium stabilization and packaging began in late 2001
 - Rocky Flats Environmental Technology Site (RFETS)
 - Hanford Site
 - Los Alamos National Laboratory (LANL)
 - Lawrence Livermore National Laboratory (LLNL)
 - Savannah River Site (SRS)

K Area Storage in 2000



K Area Storage in 2018





3013 Container
(~30 lbs.)

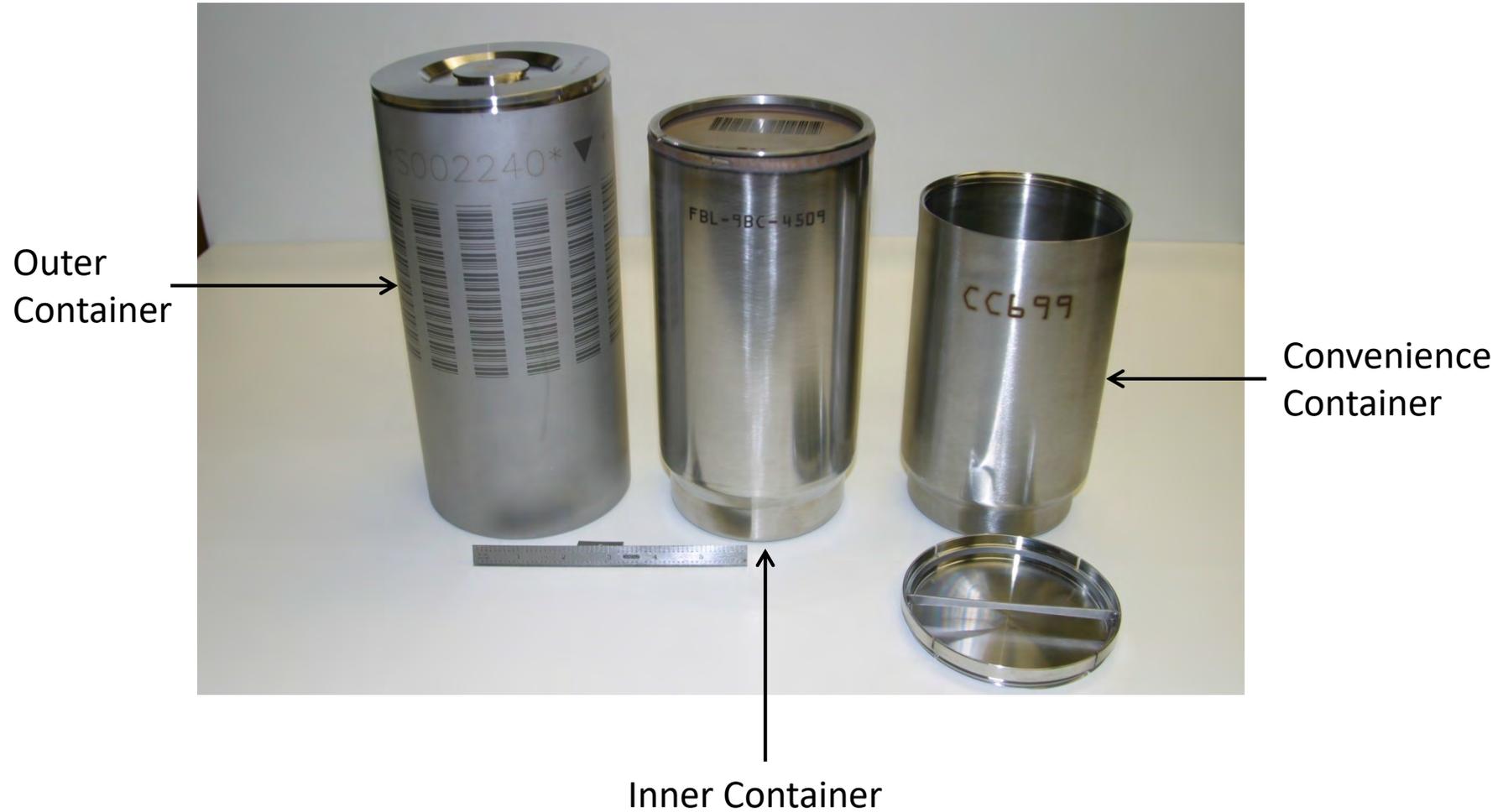


9975 Shipping Container
(~400 lbs.)

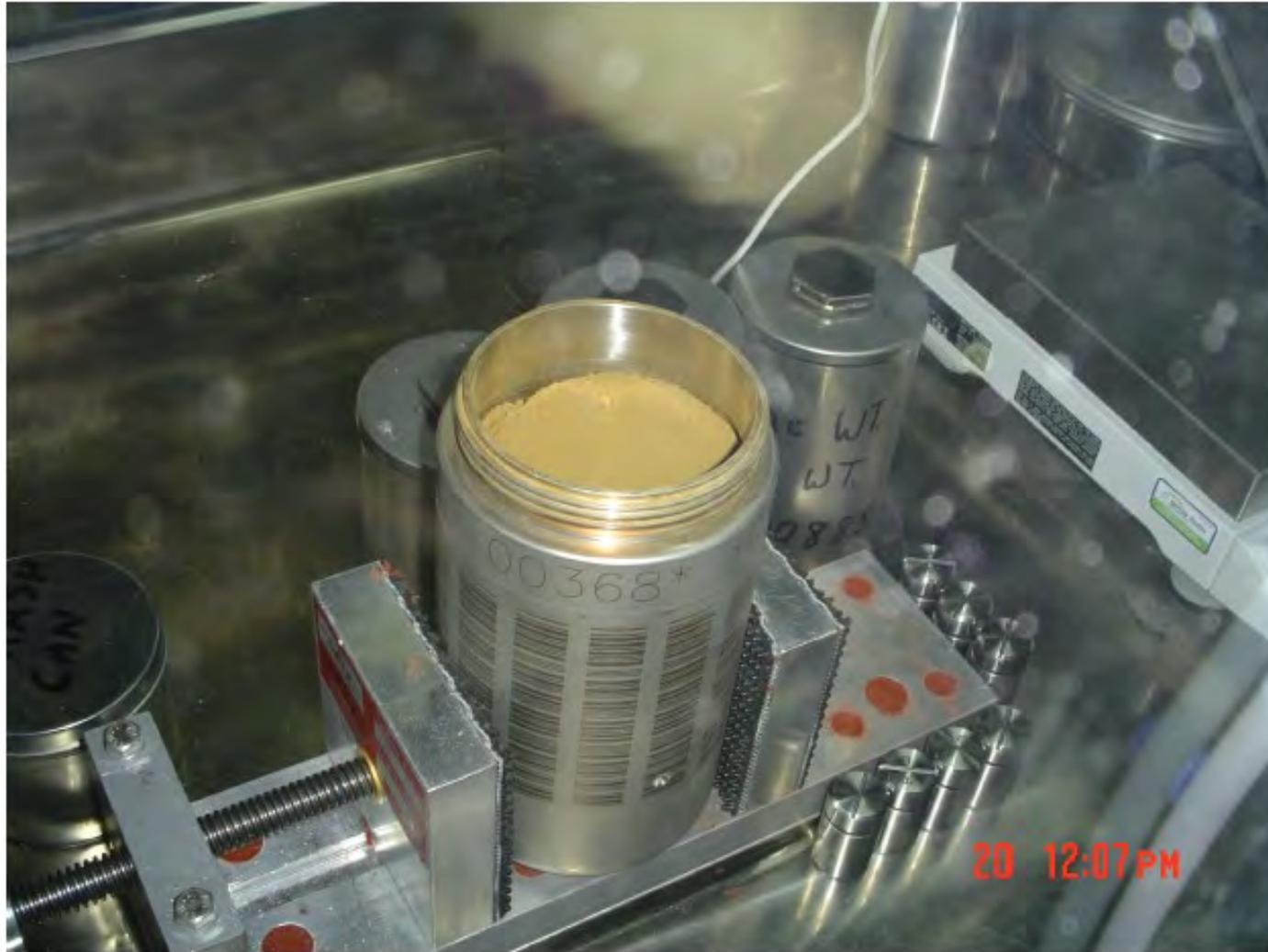


9975 Cross-Section View

Example 3013 Container Set (SRS)



Convenience Container with Pu Oxide



Pu Oxide Transferred into Pan for Sampling



3013 Surveillance Program

- Surveillance and Monitoring Program approved in 2003
- Materials Identification and Surveillance (MIS) Working Group provides guidance and performs the technical oversight for the program
 - Consists of technical experts from the plutonium processing sites and laboratories (SRS, Hanford, LANL, and LLNL)
 - Selects 3013 containers for Destructive Examination at SRS and evaluates the results
 - Containers selected are a combination of randomly selected containers and ones selected by the MIS based on Shelf-Life and surveillance results
- Shelf-Life and corrosion tests
 - Containers of plutonium-bearing materials were selected that are representative of all of the different types of materials packaged
 - Tests bound the gas generation and corrosion that might occur in actual containers

3013 Surveillance Program (cont.)

- Non-destructive examination (NDE) and destructive examination (DE) of stored 3013 containers are performed at SRS
- NDE started in 2005
 - Radiographic examination for possible pressurization
 - External examination of containers for any evidence of corrosion
 - NDE of the randomly selected containers was completed in FY2010
- DE started in 2007
 - Analyzes gas composition and measures gas pressure
 - Metallurgical examination of containers for evidence of corrosion
 - Chemical and physical analyses of the material
 - Currently examining 6 containers per year
 - Scheduled to complete randomly selected containers in FY2025
 - DE will continue as long as containers are stored at SRS
- Surveillance program has not identified any condition that would challenge the 50 year storage life
- Continue to perform Destructive Examinations in K Area and Shelf-Life program at LANL to validate storage life

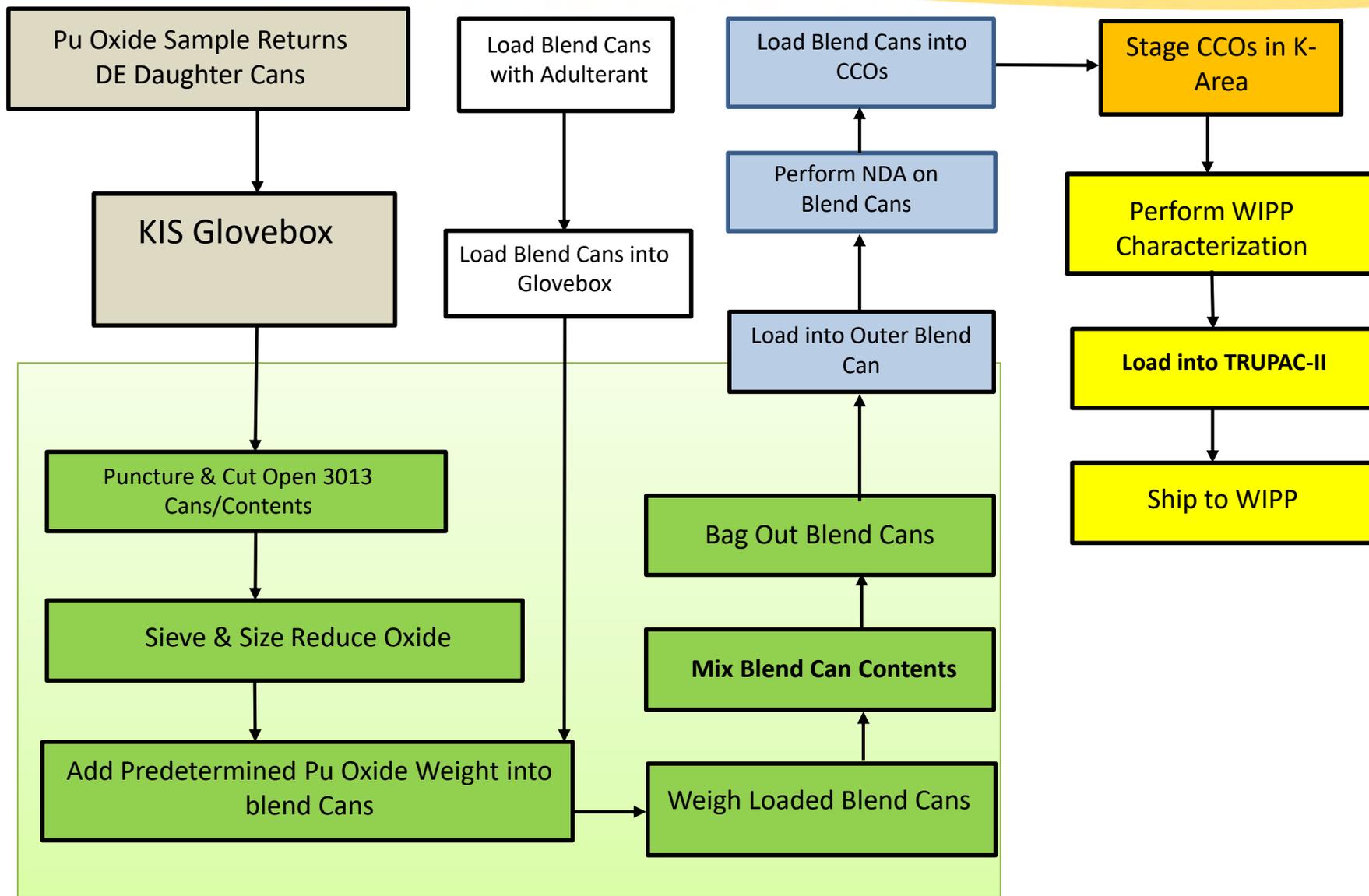
- BACKGROUND

- Prior to 2012, SR was dissolving Pu and discarding to high level liquid waste for incorporation into high level waste glass.
- In FY2012, Savannah River Site changed and began dry down blending with an inert agent in H Area for disposal at the DOE's Waste Isolation Pilot Plant.
- Due to conflicting missions and budgets, SRS terminated down blending in H Area in FY2013.
- SRS was in the middle of shipping the down blended material to WIPP when it was interrupted in early 2014 due to fire/release at WIPP
- SRS resumed shipments of down blended Pu to WIPP in April 2017 and SRS completed the current campaign in August 2017

Blend down Program Status

- Status
 - The Department issued a Record of Decision for the Supplemental Environmental Impact Statement for the down blend and disposal of up to 6 metric tons of surplus Pu
 - Due to reduction in DE surveillance, SRS resumed down blending operations in K Area in FY2016; down blending continues in K-Area utilizing a one-shift operation funded by EM

K-Area Plutonium Downblending Flowsheet





Plutonium Oxide in Weighing/Inspection Pan in K-Area Glovebox



K-Area Inner Blend Can



- Size Reduction Tools



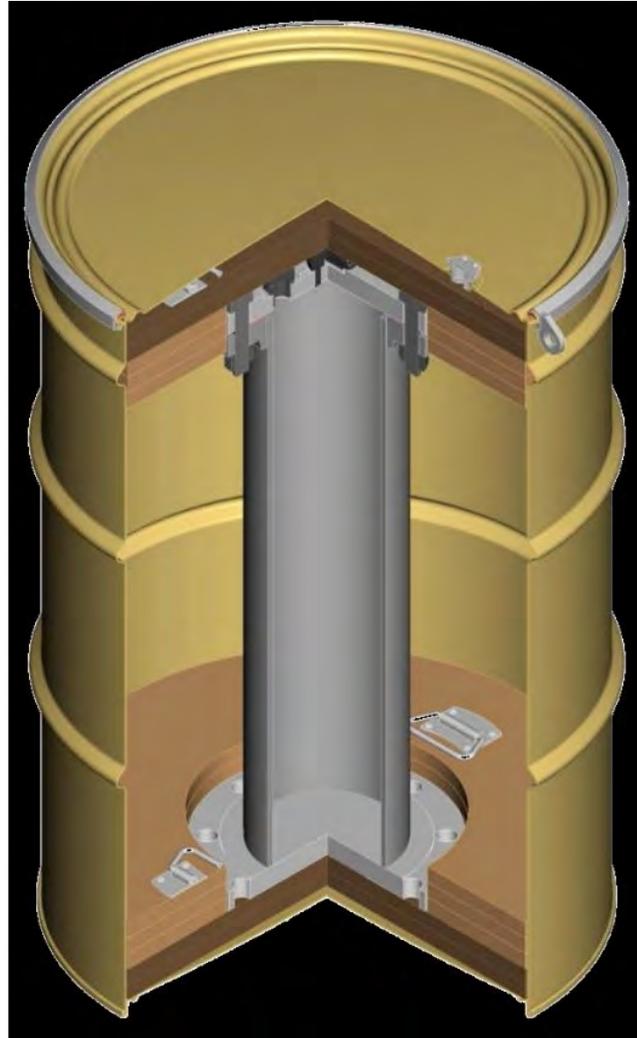
K-Area Plutonium Inner Blend Can Mixer



Inner Blend Can Inserted into Outer Blend Can



Criticality Control Over-pack (CCO)



- Pu is safely stored in K-Area
- SRS continues to evaluate storage conditions to ensure safe storage
- SRS has the experienced staff and facility to handle Pu
- SRS is currently and plans to continue down blending the 6MT of EM Pu for disposal at WIPP (funding dependent)